Remarks

Claims 1-9, 12-14, 16-19, 21-22, and 24-26 remain pending in this application. Claims 1-2, 5, 8-9, 16-17, 19, 21-22, 24-26, were rejected under 35 U.S.C. §102(e) as being anticipated by Howard (Publication No.: US 2002/0024500 A1). Claims 3-4, 6-7, 12-14, and 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Howard in view of Wu, U.S. Patent No. 5,793,353. These rejections are respectfully traversed.

THE CLAIMED INVENTION

The claimed invention is directed to a computer system, a method of operating a computer system, a method of indicating a position on a display screen, and a pointing device for a computer system having a display screen. In exemplary embodiments of the invention, a beam of light is emitted from a pointing device to contact a position on a display screen, and in response a cursor is moved to the indicated position. In other exemplary embodiments, the emitted beam of light indicates a position on the display screen, and the cursor is moved to the indicated position.

THE PRIOR ART REFERENCES

The Howard Reference

Howard discloses a wireless control device in which a housing that is worn on the operator's wrist emits five beams of light toward the operator's finger tips or hand. The operator moves individual finger tips or the hand to interrupt the light beams. The light reflected back from the finger tips or hand is detected and used to control something, such as the position of a cursor on a screen.

The Wu Reference

Wu discloses a cursor pointing device in which a housing is coupled to a processor through a cable.

ARGUMENT

In the present invention, the position to which the cursor is to move is indicated by the emitted light, for example by the position at which the emitted light contacts the display screen. In Howard, the position to which the cursor is to move is indicated by the movement of the operator's fingers or hand which reflect light back to detectors on the housing.

The Office Action contends that Howard teaches a position detecting unit which detects the position at which the beam contacts the display screen, and cites Howard at Figures 1-3 and paragraphs 0027-0032. This contention and the rejection based on it are traversed.

Paragraphs 0027-0032 of Howard read (with emphasis added):

> [0027] Referring now to the drawings, and more particularly to FIGS. 1 and 2, there is shown an exemplary and generalized application of the improved wireless control device 10. An operator 20 wears a small, lightweight housing 22 on at least one wrist or other convenient location on the body. The wrist is preferred as being proximate to the fingers which would ordinarily be used to operate a keyboard. However the invention may be adapted freely in accordance with its basic principles of operation as desired to accommodate the operator as a manner of convenience, physical handicap, or the like. A controlled device 24 is provided and includes a sensor 26 for light or any other form of energy suitable for transmission of a coded signal. Controlled device 24, hereinafter referred to as a base station for generality, preferably also includes a transducer 28, such as a display or an audio annunciator such as a beeper or speech synthesizer, to confirm receipt of a coded signal 30 and recognition of its content. Alternatively, annunciation could be in housing 22 and could respond to a light signal from base unit 24 (e.g. housing 22 could emit a beep when a signal is received).
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> [0028] As shown generally in FIG. 2 and explained in greater detail in the above-referenced related patents and applications, light emitters 32 on housing 22, which are preferably light emitting diodes ("LEDs") operating in the

infrared range, project well-defined beams of energy 34 over a limited solid angle generally parallel to the palm of the operator's hand. The solid angle of the beams is preferably limited such that the illuminated regions will not overlap at a distance from housing 22 that is closer an [*sic*] the fingertips of the operator. Thus, movement of the operator's hand, such as movement of a finger in a motion similar to pressing a key on a keyboard, will cause the tip of the operator's finger to be illuminated by a beam 34. This illumination is reflected 34 from the operator's fingertip and detected by a detector 36, also on housing 22. Thus, by correlation of reflected beams of light 34a with emitted beams of light 34, the placement of any finger or other object can be not only detected but also differentiated from any other location, and an appropriate coded signal 30 can be sent from housing 22 to base station 24. Coded signal 30 can be sent by one of light emitters 32 or by a separate signal emitter 38.

[0029] While it is preferred, for simplicity, to energize light emitters 32 in succession in a time-multiplexed fashion, it will be recognized by one skilled in the art at [*sic*] reflected beams 34a can be distinguished by other expedients such as frequency modulation or pulse width coding. Depending upon the intended use of device 10, housing 22 may optionally include a motion sensor 40, such as an accelerometer or gyroscope, for detecting motion of a body part of operator 20 in space, and an environmental condition sensor 42. Environmental condition sensor 42 can be adapted to measure any number of environmental or physiological conditions, including, but not limited to, blood pressure, humidity, temperature, and air pressure, as required by particular applications of device 10. A voice recognition sensor 43 may also be provided.

[0030] FIG. 3 illustrates an embodiment of device 10 adapted for optical pointing, such as for movement of a cursor on a computer screen, much like the manner of the mouse familiar to personal computer users (that is, based on the angle of the hand at the wrist). However, one skilled in the art will appreciate that the optical pointing applications of the present invention are not limited to cursor pointing. At least one x-axis emitter-detector pair 44 and at least one y-axis emitter-detector pair 46 are provided on housing 22. The emitter in x-axis emitter-detector pair 44 is oriented to illuminate the knife edge of the hand (that is, the edge of the hand opposite the pinky finger) in fan shaped x-axis beam 48. Similarly, the emitter in y-axis emitter-detector pair 46 is oriented so as to illuminate the heel of the hand in fan shaped y-axis beam 50. The use of fan shaped beams 48 and 50 reduces the effects of perpendicular motion of the hand surface on the measurement of wrist angles as described below. This illumination is reflected from the hand and back towards the detectors of emitter-detector pairs 44 and 46: light reflected off the knife edge of the hand is detected by the detector in x-axis pair 44, while light reflected by the heel of the hand is detected by the detector in y-axis pair 46. Device 10 then interprets the magnitude of reflected beams 45 and 50 as a particular hand position in the above-described fashion, and can initiate corresponding cursor movement accordingly.

> [0031] The angle of the hand at the wrist determines the magnitude of the reflection of beams 48 and 50 detected by the detectors of pairs 44 and 46, respectively, and the magnitude detected in turn determines the direction and duration of the responsive cursor motion. For example, when operator 20-au s his hand outward at the wrist (that is, in the direction of arrow a, decreasing the angle between the pinky finger and the forearm), the magnitude is [*sic*] of the reflection detected by x-axis pair 44 increases, and a corresponding motion of the cursor in the x-direction occurs. Similarly, when operator 20 angles his hand upward at the wrist (hat [*sic*] is, into the plane of the paper in the direction of arrow b, decreasing the angle between the back of the hand and the forearm), the magnitude of the reflection detected by y-axis pair 46 decreases, causing a i corresponding movement of the cursor in the y-direction.
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> [0032] A variety of methods can be employed to eliminate unintentional movement of the cursor while device 10 is in use. For example, the magnitude of the reflected beams 48 and 50 is time-averaged in order to reduce background noise such as inadvertent, minor movements of the hand. Additionally, a threshold can be set in the x-, y-, and z-directions, below which no motion is passed to the cursor or reducing the likelihood that the cursor will respond to minor movements of the hand. Audio or voice actuation, or a particular arm movement (e.g. as if reaching for a mouse) could be employed alternatively or in combination to employ the demand mode discussed below. Proper responses to particular movements or gestures can be developed by using any adaptive arrangement as will be familiar to one skilled in the art.

While paragraph 0027 states that controlled device 24 includes a sensor 26 for energy suitable for transmission of a coded signal, and includes a transducer 28, such as a display, to confirm receipt of a coded signal, there is no disclosure or suggestion in paragraph 0027 of moving a cursor on the display 28, let alone of moving the cursor to a position indicated by the position at which the light contacts the display. Howard's display 28 does not have a cursor.

Paragraph 0028 states that in Howard's device, the movement of the operator's hand, such as a finger tip, causes the operator's finger tip to be illuminated by the beam of light, and that reflected light from the fingertip is detected.

Paragraphs 0030 and 0031 describe control of a cursor by using the light beam to sense movement of the operator's hand. No discussion appears anywhere in Howard of

moving the cursor based on the position on the display contacted by the light.

With regard to claim 24, Howard likewise does not disclose or suggest a pointing device having a position indicator actuable to cause the pointing device to point to a position on a display screen, permitting a computer system to move a cursor to the pointed position and fix the cursor at the pointed position.

Wu does not show or suggest moving a cursor on a display based on the position on the display that is contacted by the light from a position indicator or based on a pointing device pointing to a position on the display.

It is accordingly submitted that neither Howard nor Wu, nor the combination of Howard and Wu, provides a proper basis for rejecting any of the claims of the present application.

CONCLUSION

In view of the foregoing, Applicant submits that claims 1-9, 12-14, 16-19, 21-22, and 24-26, all the claims presently pending in the application, are patentably distinct over the prior art of record and are allowable, and that the application is in condition for allowance. Such action would be appreciated.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned attorney at the local telephone number listed below to discuss any other changes deemed necessary for allowance in a telephonic or personal interview.

To the extent necessary, Applicant petitions for an extension of time under 37 CFR §1.136. The Commissioner is authorized to charge any deficiency in fees, including

extension of time fees, or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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James N. Dresser
Registration No. 22,973

MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC
8321 Old Courthouse Road, Suite 200
Vienna, Virginia 22182-3817
(703) 761-4100
Customer No. 21254